DOCUMENT RESUME

ED 086 950 CS 000 879

AUTHOR Marcus, Albert
TITLE Reading as Reasoning; Reading as Ambiguity: Understanding Sentence Structures.
PUB DATE Nov 71
NOTE 16p.; Paper presented at the Annual Meeting of the National Council of Teachers of English (61st, Las Vegas, Nov. 25-27, 1971)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Intermediate Grades; *Language Skills; Reading; *Reading Comprehension; *Reading Instruction; Reading Research; Reading Skills; Semantics; *Sentence Structure; Syntax; *Teaching Methods

ABSTRACT

If in reading a sentence a reader finds something unfamiliar in lexical meaning or grammatical structures, the meaning of the written material may be ambiguous to him. Sometimes the context will help to clarify the meaning of an unfamiliar element, but often it won't. Understanding what is read involves not only the process of reasoning, but also the process of eliminating ambiguity. In this study of students' comprehension of sentence structure, it was found that many intermediate grade students (grades 5-8) had difficulty recognizing sentence transformations with equivalent meanings. They also had difficulty recognizing the kernel sentences of larger sentences. The study indicated that there was a wide range in the abilities of the students to recognize sentence transformation with equivalent meanings and kernel sentences of larger sentences. A teacher can help students increase their understanding of sentence structures by exploring with them the various ways in which the same concept can be stated. Teaching the equivalency of one structure to another can be used as a basic method of expanding students' understanding of the literal meaning of various types of sentence structures--whether the structures are infrequently used, highly complicated, nonstandard, or ambiguous standard English sentences. (WR)

ED 086950

Dialogue 1

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National Council of Teachers of English 61st Annual Meeting in Las Vegas, Nevada, November 22-27

Dialogue 1: Diagnosis and Treatment of Reading Disabilities.

Reading as Reasoning; Reading as Ambiguity: Understanding Sentence Structures

Albert Marcus

Assistant Professor
Education Department
Baruch College CUNY
New York, New York

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The editors of the Reading Research Quarterly recently reprinted Thorndike's classic study on reading comprehension, "Reading as Reasoning: a Study of Mistakes in Paragraph Reading". It is over half a century since Thorndike reported his work in 1917, and we are still attempting to clarify our knowledge of what is involved in the reading process.

Reading specialists have generally classified the comprehension aspects of reading into three types of meaning - literal comprehension, interpretation, and critical evaluation skills. Smith says that deriving literal comprehension meanings represents "the skill of getting the primary meaning conveyed by the exact words, sentences or paragraphs of the text." Interpretation skills are generally defined as reasoning with the facts to arrive at meanings that may be unstated. Unfortunately, this classification system and the definitions of the subskills has de-emphasized the role that reasoning plays in deriving the denoted meaning of sentences.

Much of the research in reading comprehension has been unproductive because it has been tied to standardized tests of reading comprehension. Most paragraph comprehension tests consist of a series of graded reading selections whose reading difficulty is controlled by varying the word structure, sentence structure, vocabulary load, and the concept load of the selection. In order to comprehend a paragraph, the reader must decode the words, know the lexical meaning of the words, and understand the grammar of the sentences used in the selection.

All three of these aspects of reading operate when a person reads written passages, and reading researchers examining the process of comprehension should control for those not under consideration when investigating reading comprehension.

Thorndike does not appear to have controlled for the various factors involved in reading, but whatever other inadequacies his study may have, his main conclusion is still as valid today as it was then. He stated that the process of reading school texts seems to "involve the same sort of organization and analytic action of ideas as occur in thinking of supposedly higher sorts."

Thorndike was concerned with students' attempts to derive meaning from long, complicated sentences. Reading is also reasoning even when it involves deriving the meaning denoted within simple syntactic structures. The derivation of meaning from simple sentences without conscious awareness of thought processes is as much a process of reasoned thought as the derivation of meaning from highly complex sentences where the reader has to pause to "figure out" the meaning. Just because understanding a simple sentence seems to come naturally and without trouble does not mean that some type of reasoning has not occurred.

Within the area of arithmetic the concept of a one-to-one correspondence is fundamental to more complex concepts of mathematics. This concept is basic to understanding numerical sets of items. Both a picture of five horses and a picture of five apples illustrate the numerical set <u>five</u>, and the perception of the numerical sameness of the sets and the differences between one set and another are the fundation of an independent counting system.

In the usual transmission of meaning through language we are generally concerned with denoting the interrelationships between objects and concepts within our environment. We do not denote concepts exclusively related to mathematical relationships. But just as the mathematical counting system is based on a one-to-one correspondence, denoting meaning through language (in its simplest form)* also relies on the recognition of one-to-one correspondences. In the often used English sentence "Dog bites man." the sequence of words denotes a particular relationship indicating who does what to whom. There is a one-to-one correspondence between what is happening and how it is expressed in English. By "seeing" the one-to-one correspondence denoted by this sentence structure with things happening around us and through habituated use of this sentence pattern, this noun-verb-object order has come to signify a particular kind of relationship within our environment.

The grammatical structure of the language denotes logical thinking when a one-to-one correspondence is maintained between what is described and its representation in language. Because children are so actively involved in the speaking and listening activities of oral language, they pick up the logic of the language naturally from their everyday interlanguage activities with others. The basic presumptions of imparting meaning through speech rely on logical relationships no less so than those of mathematics.

*The author does not refer to the use of simile, metaphor, or other literary and poetic methods for creating meaning.

A child learns to decode those sentence structures with which he comes into contact by recognizing the one-to-one correspondence of language and reality. In learning a new structure he must learn to recognize the particular one-to-one correspondence between language and reality that this new structure represents.

When a student reads a passage he must reason out the meaning as he decodes the printed words into speech. To get the denoted meaning he must be able to decode the words, he must know the lexical meaning of the words within their particular context, and he must know the way the grammatical structures of the sentences denote particular types of interrelationships.

If in reading a sentence a reader finds something unfamiliar in any one of these three areas, the meaning of the written material may be ambiguous to him. Sometimes the context will help to clarify the meaning of an unfamiliar element, but often it won't. Understanding what is read involves not only the process of reasoning, but also the process of eliminating ambiguity.

The reader who has mastered the process of word recognition, who knows the meaning of the words and the ways in which grammatical structures denote interrelationships can reason as he reads, but the reader with deficiencies in any one of these areas is faced with perplexing ambiguities as he reads.

Our speech is full of ambiguities - incompleted thoughts, extraneous words, false starts, repetitions, pauses, sentence

fragments, as well as other types of grammatical mistakes that overtake us as we try to "get out" the meanings we try to express. Often our speech is a process of refining an idea by bits and pieces to the point where we have explained away the ambiguity and lack of clarity that our initial utterance had.

Children's speech is as ambiguous as that of adults. Although many sentences of a small child just learning to speak may be ambiguous and even nonsensical to a stranger, a member of the child's family who is familiar with the child's developing speech ability is often able to translate what he thinks the child means by indicating the relationship that the child is attempting to express.

In understanding sentences, reading is reasoning; reading is eliminating ambiguity. A reader unsophisticated in language may know how to reason out the one-to-one correspondences of the concepts expressed within frequently used sentence structures, but he will probably not be able to reason out the special interrelationships indicated by an infrequently used structure. Because the reader has not learned the one-to-one correspondences that the new structure represents, he cannot derive the meaning of the sentence, he can only <u>interpret</u> what he thinks is the meaning. To him the new structure is an ambiguous sentence, and his interpretation may or may not be the same as the meaning denoted by the structure.

In a study of students' comprehension of sentence structures,

I found that many intermediate grade (grades 5-8) students had difficulty recognizing sentence transformations with equivalent meanings. They also had difficulty in recognizing the kernel sentences of larger snetences. They had these difficulties despite the fact that prior to the study they had been screened to insure that they could decode the words on the test.

Two basic types of item format were used in the study. In one type of format the student's knowledge of transformations that gave equivalent meanings was measured. In the other type of format the student's knowledge of kernel sentences within subordinate or coordinate constructions was measured.

In items measuring the student's knowledge of direct object, indirect object sequence, the student was directed to choose the one sentence that had the same meaning as the underlined sentence. The percentage of students selecting each choice is given at the left.

He brought the woman her son.

3%	a. He brought the woman with her son.
3%	b. He brought the woman and her son.
21%	c. He brought the woman to her son.
74%	*d. He brought her son to the woman.

74% of the students chose the correct answer.

The students did much better on another item measuring the same structure.

She bought the cat a fish.

91%	*a. She bought a fish for the cat.
2%	b. She bought the catfish.
2%	c. She bought a fish and the cat.
5%	d. She bought the cat and a fish.

91% of the students chose the correct answer.

More students probably answered this second item correctly because they were able to use "common sense" in figuring it out. While our common sense tells us that it is reasonable for a person to buy a fish for a cat, it is as reasonable to bring the woman to her son, as it is to bring her son to the woman. When the students had to select between equally reasonable choices, fewer of them were able to make a decision based on their knowledge of the structure. This leads to the disquieting conclusion that the first item probably gives a more valid measure of the students' understanding of the direct object/indirect object sentence structure itself.

It is interesting to note that in five of the six items measuring this structure the incorrect choice that the largest percentage of students selected kept the basic direct object/ indirect object sequence of nouns that the lead sentence had.

In a test item consisting of a complex sentence where a relative clause modified the subject of the sentence, the students were directed to choose two sentences that say something true about the underlined sentence. (The kernel sentences of the larger sentence.)

The boys who chased the dogs ran around the corner.

75%	*a.	The boys ran around the corner.
19%	b.	The dogs ran around the corner.
3%	c.	The dogs chased the boys.
10%	d.	The boys whom the dogs chased ran around the corner.
92%	*e.	The boys chased the dogs.

69% of all students chose both kernels.

To understand the sentence the student must know both ker-

nel sentences. Sixty-nine percent of the students chose both correct answers. Nearly 20% chose the sequence The dogs ran around the corner most likely because it looked like a meaningful sentence within the larger structure. In other items many students made the same type of error by choosing misleads where an arbitrary sequence of words "appeared" to create a kernel sentence of a larger structure.

In a test item where a relative clause modifies the subject of the main clause and the relative pronoun acts as an object of a preposition, thirty-four percent of the students selected choice c, a mislead where the sequence of words looked like a kernel sentence of the larger sentence.

The boy to whom she gave the rabbit climbed through the hole in the fence.

63%	*a.	The boy climbed through the hole in the fence.
11%	b.	The boy gave her the rabbit.
34%	c.	The rabbit climbed through the hole in the fence.
88%	*d.	She gave the rabbit to the boy.
4%	e.	She climbed through the hole in the fence.

59% of all students chose both kernels.

Embedded subjective complements were difficult for the students to interpret. In the following item the students were directed to choose two sentences that say something true about the underlined sentence. Seventy-two percent of the students chose both correct answers.

The old man outside owns a small cat.

95%	*a.	The old man owns a small cat.
3%	b.	The old man's cat is outside.
75%	*c.	The old man is outside.
7%	d.	The cat that the old man owns is outside.
19%	e.	The old man owns the small cat outside.

72% of all students chose both kernels.

The study indicated that there was a wide range in the abilities of the students in recognizing sentence transformations with equivalent meanings and kernel sentences of larger sentences.

A rank order of the seventeen structures measured in the study indicated that eighty-six percent of the responses were correct on items of the easiest structure (elliptical structures of coordination), while only forty-six percent of the responses were correct on items of the most difficult structure (prepositional phrase modifiers).

The results of this study gave ample evidence of students' problems in understanding transformations that denote equivalent meanings. Writers often use transformations to add stylistic variation to their work. Two other techniques of stylistic variation that writers use for denoting equivalent meanings are partial sentence transformations and paraphrased sentences. A reader's ability to recognize equivalent transformations, partial transformations, and paraphrased sentences indicates that he realizes that either one of a pair of structures represents the same one-to-one correspondence of interrelationships.

Just as redundancy is built into sentence structures, redundancy is often built into paragraphs. The main idea of a paragraph, as well as the examples of the main idea, is often restated wholly or in part within the body of a paragraph. These restatements can be either complete or partial transformations of the original sentence(s) or paraphrased restatements of the original sentence. Understanding paragraph structure (and thus the

study of rhetoric) rests on the ability to differentiate when a change of structure denotes a different meaning (content) and when a change of structure serves only as a stylistic mechanism for changing the "form" of a sentence while the content denoted remains unchanged. Examples of these three methods of rewriting sentences are given below:

1. Sentence transformations - in this type of transformation a base sentence may be changed to another sentence with an equivalent meaning by changing the word order, function words, inflectional endings, and/or derivational endings used in the base sentence. Except for changes in function words, the same vocabulary is used in both sentences.

   a. The lady gave the boy a puppy. =
   The lady gave a puppy to the boy.
   (indirect object/direct object sequence)

   b. The lady gave the boy a puppy. =
   The boy was given a puppy by the lady. =
   The puppy was given to the boy by the lady.
   (passive)

   c. It was after she left that they came. =
   They came after she left.
   (included clause)

   d. Bob described it to the mayor's satisfaction. =
   Bob's description of it satisfied the mayor.
   (nominalizations of active verbs)

2. Partial sentence transformation (or partial paraphrase) - in this type of transformation a base sentence may be changed to another sentence with an equivalent meaning by changing the word order, function words, inflectional endings, and/or derivational endings used in the base sentence. There is also a minimal change in the vocabulary used.

   a. Mrs. Johnson made the parks beautiful. =
   Mrs. Johnson beautified the parks.
   (verbifying an adjective)

b. He falsely changed the records. =
He falsified the records.
(verbifying an adverb)

c. There is a defect in the machine. =
It is a defective machine.
(adjectiving a noun)

3. Paraphrased sentences - in this type of transformation the same meanings are denoted in another form. The equivalent sentences may or may not be different syntactically. The vocabulary of paraphrased sentences is usually different.

a. It is doubtful that it will surprise anyone that there are 400 different kinds of mushrooms.
It will probably come as a mild shock to no one that there are all of four hundred types of mushrooms.

Expanding Students' Knowledge of Sentence Structures

Research indicates that the ability of students to understand various types of sentence structures is related to their knowledge of the sentence structures within their own spoken dialect, those structures that they have come to recognize in the speech of others, and those that they have been "formally" taught.

Obviously there should be a direct relationship between the types of structures used in basal readers and the sentence structures that a student understands. Unfortunately, a student may be required to read a sentence pattern before he has learned the one-to-one correspondence of relationships that the pattern represents. The readability level of basal readers is usually raised by increasing the vocabulary load or the sentence length. Because average sentence length is the primary sentence factor controlled for in basal readers, unfamiliar and infrequently

used sentence patterns can be, and often are, arbitrarily introduced into the text.

The introduction of sentence patterns into basal reading texts should be as carefully controlled as the introduction of new vocabulary terms have been in the past. And just as unfamiliar vocabulary words are introduced and explained prior to reading a selection, unfamiliar sentence structures that appear in a selection should also be explained before the students read sentences with that structure within a selection. At times the language arts program should be used to reinforce the students' understanding of the structures that have been introduced within the reading program.

A teacher can help students increase their understanding of sentence structures by consciously and continually exploring with them the various ways the same concept can be stated. Teaching the equivalency of one structure to another can be used as a basic method of expanding students' understanding of the literal meaning of various types of sentence structures - whether the structures are infrequently used standard English sentence patterns, highly complicated standard English sentences, nonstandard English sentences, or ambiguous sentences.

Students who speak standard English can be introduced to infrequently used standard English sentence patterns and the more complicated standard English sentences. Students who speak a nonstandard dialect of English should first be introduced to

equivalent structures of standard English. The teacher need not be fluent in the dialect, only aware of the obvious interference points. The teacher's instruction can focus on these differences. After the nonstandard dialect speakers have mastered the more frequently used standard structures, they should be taught the infrequently used and more complicated written standard English sentence structures. Both nonstandard dialect and standard dialect speakers of English should be taught the various meanings denoted by ambiguous sentences.

To help clarify the relationship of meaning and sentence structure I'd like to briefly explore a classification of sentences that includes the aspects of meaningfulness, grammaticalness, stylistics, and ambiguity. The basic classification with some examples is listed below:

1. Sentences that are meaning bearing, grammatical, stylistic, and unambiguous (standard English). Sentences of this type include those based on patterns accepted as standard.

   John ate the apple.
   The cat was chased by the dog.
   The man gave them a test.
   The car is running.

2. Sentences that are meaning bearing, grammatical, nonstylistic, and unambiguous. (standard English) Although these sentences are grammatical, unambiguous and meaning bearing, they are awkward.

   The woman whom Uncle Robert liked handed the gift to the doctor whom she visited.

   Kernel sentences:

   Uncle Robert liked the woman.
   The woman visited the doctor.
   The woman handed the doctor a gift.

3. Sentences that are meaning bearing, grammatical, stylistic, and unambiguous within nonstandard dialect (nonstandard English) These sentences may be ambiguous to speakers of standard English.

Michael and John they out playing.
He out working.
I ain't eaten nothin all day.

Teaching sequence:

Michael and John they out working.
(Black dialect - double subject, verb are omitted)

Michael and John they are out working.
(transitional teaching sentence - double subject, verb are added)

Michael and John are out working.
(standard English - pronoun they dropped)

4. Sentences that are meaning bearing, grammatical, stylistic, but ambiguous because they bear more than one meaning.

Ambiguity due to structure.

She found him a dog. = She found him to be a dog.
(objective complement)

= She found a dog for him.
(indirect object)

Ambiguity due to usage.

She feels good. = She feels good to the touch.

= She feels well.

Note: Just as there are ambiguous structures that indicate more than one meaning within standard English, there are probably ambiguous structures within nonstandard English dialects that indicate more than one meaning.

5. Meaningless sequences of words that may appear to be meaning bearing.

Meaninglessness due to lexicon:

T'was brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.*

from Lewis Carroll's Jabberwocky*

Meaninglessness due to structure - the following are non-sentences that are unintelligible sequences of words because they depart from established English structure.

There are she to the store ran
I saw went
I can to go
Went then I

***

By teaching students the equivalency of one structure to another, their knowledge of and use of various sentence structures - whether the structures are transformations, partial transformations or paraphrased sentences - will be expanded. When the students subsequently read these structures in print, their chances of understanding the denoted meanings of the sentences will thus be increased.